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Cash Transfers in an Epidemic Context

The Interaction of Formal and Informal Support in Rural Malawi

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Abstract

This paper investigates the short-run consumption expenditure dynamics and the interaction of public and private arrangements of ultra-poor and labor-constrained households in Malawi using an original dataset from the Mchinjii social cash transfer pilot project (one of the first experiments of social protection policies based on unconditional cash transfers in Sub-Saharan Africa). The authors exploit the unique source of exogenous variation provided by the randomized component of the program in order to isolate the effect of cash transfers on consumption expenditures as well as the net crowding out effect of cash transfers on private arrangements. They find a statistically significant reduction effect on the level of consumption expenditures for those households receiving cash transfers, thus leading to the rejection of the perfect risk sharing hypothesis. Moreover, by looking at the effects of cash transfers on private arrangements in a context characterized by imperfect enforceability of contracts and by a social fabric heavily compromised by high HIV/AIDS rates, the analysis confirms the presence of crowding out effects on private arrangements when looking at gifts and (to a lesser extent) remittances, while informal loans seem to be completely independent from the cash transfer's reception. From a policy perspective, the paper offers a contribution to the evaluation of the very recent wave of social protection policies based on (unconditional) cash transfers in Sub-Saharan Africa, suggesting that there might be an important role for public interventions aimed at helping households to pool risk more effectively.

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Cash Transfers in an Epidemic Context: The Interaction of Formal and Informal Support in Rural Malawi

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1. Introduction

The traditional informal system of safety nets and support based on family aid and communal living has eroded in many Sub-Saharan African countries where poverty and AIDS have destabilized households, orphaned children and changed demographic patterns (UNICEF, 2006). As a consequence, families living amid widespread poverty in AIDS-affected communities face a social protection vacuum when both informal arrangements and formal interventions fail to provide the safety net that families need to survive (Miller, 2007). Over the last decade, social protection policy frameworks have gained increasing interest and support among governments and donors in Sub-Saharan Africa. In particular, social protection in the form of cash transfers is considered to be a critical component in fighting poverty and responding to families that have been overwhelmed by disease, illnesses, and other shocks (Barrientos and DeJong, 2004).

Impact evaluations of social protection programs represent a fundamental tool for policy formulation at the national level as well as for funding decisions from bilateral and multilateral donors. However, such evaluations require a careful analysis of the interaction of a formal safety net with the informal insurance arrangements pre-existing in a particular context: in fact, in addition to direct effects, government interventions can also present indirect effects which might change the incentives to participate into private arrangements. Such indirect effects can be quite important, inducing crowding out of private insurance schemes, thus breaking down the fragile social fabric that maintains some form of social insurance among related individuals[2] (Albarran and Attanasio, 2003).

In this paper we focus on the specific context of Malawi, a country where the structure of the household and consequently the informal relationships are deeply affected by the HIV/AIDS pandemic. Using a unique and original dataset based on a randomized design, we evaluate the effects of a public unconditional cash transfers program on consumption expenditures and whether this intervention actually weakens or reinforces an already fragile social fabric. While there have been some studies of crowding out effects of social cash transfers programs in Latin America, very few studies have been done in Sub-Saharan Africa and even fewer are based on a randomized experiment. Our results indicate that the impact on consumption expenditures for those households

[2] However, the side effects of a public intervention program do not need to be negative: while it is possible that some activities are crowded out, others could grow as a consequence of it (Albarran and Attanasio, 2003).

receiving cash transfers, leading to the rejection of the perfect risk sharing hypothesis, while the presence of crowding out effects on private arrangements is confirmed for gifts and (to a lesser extent) remittances, but not for informal loans.

The analysis is based on the Mchinji Social Cash Transfer Pilot Scheme[3], one of the first social protection experiments in Sub-Saharan Africa and considered to be a major tool for poverty reduction in the Government of Malawi's National Social Protection Policy. The Scheme covers more than 3,000 households living in rural villages in the Mchinjii area (central Malawi) and has the objective to alleviate poverty, reduce malnutrition and improve school enrolment among the poorest 10% of households through regular and reliable cash transfers. From an econometric perspective, most of the studies of the crowding out effect suffer from important endogeneity problems due to the so-called "program placement effect" (Rosenzweig and Wolpin, 1994)[4]. In this paper we avoid such effect by exploiting the source of exogenous variation given by the randomized design of the dataset, which allows us to properly isolate the effect of cash transfers on the recipients' welfare. We first assess the type of risk sharing arrangements (i.e. perfect, partial or autarchy) existing at village level by measuring the impact of unconditional cash transfers on households' consumption expenditures, controlling for aggregate resources. Then we assess how previously existing arrangements based on private inter-household transfers are affected by the introduction of public transfers. To this aim, the dataset distinguishes between three different types of private transfers: 1) gifts (i.e. monetary or in-kind transfers without any repayment expectations attached), 2) loans (i.e. monetary transfers with mandatory repayment) and 3) remittances (monetary transfers from household members living abroad), thus leading to a better understanding of how crowding out effects may differ according to the type of private transfer.

The contribution of this paper to the academic and institutional debate on social protection policies is twofold: first, it suggests that there might be a role for public interventions aiming at helping households to pool risk more effectively as it shows that the perfect risk sharing hypothesis (once again) does not represent a proper description of the reality, even with reference to small village economies deeply affected by the HIV/AIDS epidemic. Second, it provides empirical support to the analysis of the interaction of public programs and private transfers, showing how certain types of transfers (i.e. gifts and remittances) are more likely to be crowded out than others

[3] For further details on the program see www.childpolicyresearch.org

[4] Typically, public programmes are targeted towards households that are in particular need of transfers and this makes it difficult to identify the net effect of public transfer programmes on private transfers and to assess what the level of private transfers would have been in the absence of a given programme comparing beneficiaries to non-beneficiaries.

(i.e. informal loans), thus providing useful insights for the proper design and implementation of social protection policies in a context characterized by imperfect enforceability of private insurance contracts and imperfect capital markets.

The paper is organized as follows: Section 2 further explores the literature and the theoretical framework; Section 3 presents the main features of the Mchinji cash transfer program; Section 4 describes the data; Section 5 shows the econometric analysis and the results; Section 6 concludes.

2. Theoretical Framework

In the present paper we combine the stream of economic research on consumption smoothing and perfect risk sharing in small agricultural societies (village economies) with the one on the interaction of public and private insurance schemes.

The first line of research, started by the seminal work of Townsend (1994) on Indian villages, focused on testing the perfect risk sharing hypothesis. Townsend showed that perfect insurance markets (i.e. markets which allow individuals to smooth idiosyncratic income shocks) are not a good description of the reality. Since his work, several other empirical works aimed at testing the perfect risk sharing hypothesis by looking at whether idiosyncratic shocks have an impact on consumption growth. They all have found evidence of partial risk sharing practices in several different contexts such as households in North Nigeria (Udry, 2004) or extended families in the US (Hayashi et al., 1996). Dercon and Khrisnan (2000) have further developed this type of research by looking at intra-household risk sharing practices in rural Ethiopia and end up rejecting the collective model of household organization, while Grimard (1997) looked directly at community level mechanisms and investigates the hypothesis that households in Cote d'Ivoire take part in spatially diversified risk-sharing arrangements with members of their own ethnic group. Along these lines, Jayne et al. (2006) present a first attempt of quantitative research in this innovative area with a study on community-level impacts of AIDS related mortality in Zambia. By using a set of community level indicators (e.g. changes in area of cultivated land, crop output and per capita income), they examine rural community resilience, that is those factors explaining why some communities appear better than others to share the idiosyncratic shocks linked to AIDS related mortality despite similar adult mortality rates. Dercon and Krishnan (2003) use public transfers in the form of food aid to test for the presence of perfect risk sharing arrangements at the village level

in rural Ethiopia. They end up rejecting the perfect risk sharing hypothesis in favor of partial risk sharing via transfers and they also address the issue of crowding out of informal insurance, thus bridging with the part of the academic literature that deals specifically with the investigation of the effects of public transfers on private arrangements. In fact, if, on one side, the rejection of the perfect risk sharing hypothesis suggests that there might be an important role for interventions aiming at helping households to pool risk more effectively (Morduch, 1999), on the other side, argues that such interventions do not occur in a vacuum but are the direct and indirect effects of certain government interventions that change the incentives to participate into private arrangements (Attanasio and Rios-Rull, 2000).

Studies on how public insurance can substitute private arrangements have been done with reference to both developed and developing countries: Cutler and Gruber (1996) on the expansion of Medicaid coverage and the reduction of private coverage; Cox et al. (1998) on the crowding out effect of social security benefits on private transfers in Perù; Jensen (2003) on a large increase in state old age pensions in South Africa showing that for each rand of public pension income to the elderly, there is a .25-.30 rand reduction in private transfers from children living away from home. In order to fully understand how public transfers affect private transfers it is then important to analyse what are the underlying motives for private transfers. In fact, different motives can have different implications as well as different channels of interaction for private and public transfers. In addition to altruistic or exchange motives, private transfers can also be just part of an insurance scheme where households are linked in order to share idiosyncratic risk, through either perfect or imperfect risk sharing practices. The imperfections that prevent risk sharing can be due to asymmetric information or impossibility of enforcing contracts. In the latter case individuals facing idiosyncratic risk can partly reduce it by entering contracts that are self-enforceable and there is a stream of theoretical literature dealing precisely with the issue of contract enforcement and limited commitment in risk sharing (Kocherlakota, 1996, Thomas and Worrall 1988, Dubois et al. 2007). As stated by Albarran and Attanasio (2003), models with imperfect enforceability explain small village economies, characterized by good information flows, repeated interactions and can replicate features of inter-households agreements. The main prediction of this type of model is that a welfare programme that involves public transfers to some or all partners of an insurance agreement with imperfect enforceability is likely to reduce private transfers. However, the amount by which private transfers are reduced is determined by features of the economy like the variance of income and its persistence. As contracts are self-enforcing, the amount of risk sharing depends on the value of autarchy (i.e. the state of an individual who does not engage in trading or contracts with anyone):

whatever increases the value of autarchy, decreases risk sharing (e.g. decreasing the variance of income process or increasing the persistence of idiosyncratic shocks). Unconditional cash transfers, according to this class of models, induce an increase in the value of autarky which implies a reduction in risk sharing reflected by reduced private transfers. However, empirical evidence on models with imperfect enforceability is still limited: Foster and Rosenzweig (2001), Ligon et al. (2002) and Krueger and Perri (2006) consider different implications of imperfect enforceability and test them on data from Bangladesh, India and the US, respectively.

The closest work to the type of analysis we carry out in the second part of the paper, is the one of Albarran and Attanasio (2001) where the two authors exploit the randomized design of the PROGRESA dataset in Mexico and show the crowding out effect of the program on pre-existing private transfers that leads to an overall welfare decrease in the beneficiaries. In a subsequent work (Albarran and Attanasio, 2003), they focus on empirical implications of models with limited risk sharing due to imperfect enforceability of contracts and they show that the amount by which public transfers reduce private transfers is affected by features of the economy such as the variance of income at village level.

3. The Institutional Framework

The Government of Malawi defines social protection as "*all public and private initiatives that provide income or consumption transfers to the poor, protect the vulnerable against livelihood risks and enhance the social status and rights of the marginalized, with the overall objective of reducing their economic and social vulnerability*" (Government of Malawi, 2007).

The International Labour Organization (ILO, 2001) distinguishes these initiatives into three main broad categories: social insurance (i.e. usually contributory and tax-funded schemes), labor market regulation (i.e. legal frameworks aimed at ensuring minimum standards of working conditions) and social assistance (i.e. usually publicly funded and non contributory schemes aimed at addressing poverty and vulnerability). Social cash transfers are included in the latter category and

can be defined as the "provision of assistance in the form of cash to the poor or those who face a probable risk, in the absence of the transfer, of falling into poverty" (Tabor, 2002)[5].

3.1 The Context of Malawi

Malawi is one of the poorest countries in the world, ranking 160 out of 188 countries in the 2007 Human Development Index (UNDP 2007). Eighty-five percent of the population million lives in rural areas (entire population =14.2 million). As an agricultural society, most Malawians are dependent on smallholder farming and fishing. In 2008, gross domestic product (GDP) was USD 800 per capita, with the percentage share of household income in the poorest 10% of households at 2.9% compared to 32% in the wealthiest 10%. According to the World Bank's Malawi Social Protection Status Report (2007) the national poverty line of Malawi is set at MK16,165/year corresponding to MK44.3 or USD 0.50 per person per day, significantly below the standard USD l per day per person. The average poor household subsists on an income of around MK36.4 - 17.8 percent below the MK44.3 daily poverty line while the ultra poor subsist on MK26.40, on average.

According to the 2005 Malawian Integrated Household Survey (IHS), 52% of households fall below the poverty line, and of these, 22% fall below the ultra poverty line, so that approximately 7 million people living in an estimated 1.3 million households are absolutely poor and 3 million people living in 550,000 households are ultra poor (NSO 2005).

Vulnerability is defined as inability of households to deal with shocks to their livelihoods. Rising vulnerability implies both an increasing likelihood of shocks taking place and a declining ability to overcome shocks without experiencing livelihood collapse. Vulnerabilities affecting Malawi include (Malawi Government, 2007):

- agricultural vulnerability (i.e. erratic rainfall, land constraints, lack of livestock and constrained access to fertilizers, inputs and credit);
- economic shocks and processes (undiversified livelihoods, weak markets, interactions between transitory shocks and chronic poverty);

[5] As pointed out by Hulme (2009), in the case of Sub-Saharan Africa social assistance programmes have taken the lead and dominated the most recent social protection policies, in contrast with North Africa where social insurance is the main approach.

- health and nutrition risks (high incidence of diarrhoea, acute respiratory infection, cholera and malaria) and HIV/AIDS;
- demographic vulnerability (high population growth, increasing numbers of households headed by women, children or the elderly).

3.2 The Mchinji Social Cash Transfer Program

The Malawi Social Cash Transfer Scheme represents one of the key elements of the Malawi Growth and Development Strategy, a nationally owned strategy for investing in both economic growth and development (Government of Malawi 2006). The overall goal of the Cash Transfer Scheme is to protect and promote the livelihoods and welfare of the poorest and most vulnerable people: in particular, it has been designed to reach 10% of all households. Recipient households must meet the criteria of being ultra poor and labor constrained (Miller, Tsoka, Reichert 2010a). Ultra poor households are those living below the ultra poverty line and in the lowest expenditure quintile. They may only consume one meal per day and lack any valuable assets. Labor constrained households are those with no able bodied member between 19-64 who is fit for work or when one able bodied adult must care for more than 3 dependents (i.e. children, elderly, chronically ill persons).

The Social Cash Transfer Scheme was launched in 2007 and by February 2009 was operational in 7 out of the country's 28 districts, distributing monthly cash transfers to more than 24,306 households. If brought to scale, the SCT would cover more than 300,000 families or 10% of all households and cost approximately US$68 million per year or 1.5% of GDP (Government of Malawi, 2009).

The dataset used in this paper is from the Evaluation of the Mchinji Social Cash Transfer Pilot. The Center for Global Health and Development (CGHD) at Boston University School of Public Health in collaboration with the Centre for Social Research (CSR) from the University of Malawi conducted the external evaluation of the SCTS pilot in Mchinji district.

By March 2007, approximately 29 village groups within four out of nine Traditional Authorities (TAs) in the district were included in the transfer scheme. Village groups contain multiple villages so that the combined number of households per village group is approximately 1,000. Among these, the poorest 10% of households (approximately 100 households) per village group were identified to

receive the SCTS. However, not all village groups within the four TAs had been reached by the SCTS in March 2007, given that the scheme was scaling up through the district as time and human resources allowed. In February 2007 the District Assembly identified the next 8 village groups eligible for the SCT according to the scale-up plan. At that time, the impact evaluation team randomly assigned 4 village groups to an "intervention" group and 4 to a "control" group. While the choice of the village groups to be assigned to treatment and control was random, the selection of beneficiaries within each village group was based on a multi participatory community based targeting, which enables local community volunteers to determine which households among them are the worst off and most vulnerable[6].

The evaluation team followed both groups for one year until the comparison group of eligible households began to receive the transfer. Baseline data were collected in March 2007, before households received the cash transfer according to the government's schedule for rolling out the scheme. The second follow-up was in August 2007 and the final round in March 2008. The study included a longitudinal household survey, consisting of three rounds of collection with a panel of intervention and control households in cash transfer recipient and non-recipient village groups.

The household survey, used in the three data collection rounds, was adapted from existing household surveys used with similar populations throughout Malawi, such as the Integrated Household Survey (IHS), Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS). The household questionnaire documents basic health, demographic and economic conditions, including anthropometric measurements; food security (including the quality and quantity of meals, food diversity, and satisfaction with meals based); educational data; health, hygiene and health seeking behaviors; economic data; time use and adult and child care patterns; emotional wellbeing; mobility and migration; coping behaviors; and characteristics of the house and inhabitants. The household questionnaire was administered to the person registered to receive the cash transfer (Miller, Tsoka, Reichert 2010b).

[6] The District Secretariat trained a Community Social Protection Committee (CSPC) to help implement the scheme. The CSPC made a list of ultra poor labor constrained households based on community knowledge and the local Village Headman signs on this list. The CSPC then visited the households to fill out an application for each household. Next, the CSPC ranked households and chose the 10% poorest. A community meeting occurred where the ranking was discussed. Then Village, District, and National Committees approved the list of eligible households. Once fully approved, recipients started receiving transfers on a monthly basis.

4. The Data

The data used in this analysis are from the baseline (March 2007) and final round (March 2008) of the impact evaluation of the Malawi Cash Transfer Scheme. The latter, includes 767 households of which 374 had already started to receive the cash transfer at the time of the interview and 393 had not yet received it. We refer to the first as "treatment" group and the second as "control" group in the remainder of the paper. The sample is restricted to those households headed by an adult, thus excluding so-called child-headed household, which might be significantly different from adult-headed households and not directly comparable. The analytical sample used for the econometric analysis is therefore composed by 749 households (387 control and 362 treatment).

Table 1 provides descriptive statistics. The statistics are grouped according to the following categories: asset ownership, shocks, social safety nets, annual consumption expenditures, private transfers, household characteristics and head of household's characteristics. The latter two categories show that the intervention and comparison households were not demographically identical at baseline, as the community social protection committees appear to have prioritized elderly households in the comparison village groups and households with more children in the intervention village groups. Still, as highlighted in Miller, Tsoka, Reichert (2010b), households were statistically the same in terms of consumption expenditures, food insecurity and asset ownership at baseline, thus confirming the robustness of the randomization. Table 1 indicates that, at baseline, the average household size was 4 members per household. More than half of the households in the sample had orphans; 20% had members with some forms of disabilities; over 30% included chronically ill members; 64% were female headed and 56% were headed by over 65 years old heads (Miller, Tsoka, Reichert 2010c). Descriptive statistics in the final round show several statistically significant differences between treatment and control groups. For instance, asset ownership (measured as the number of furniture, animals and agricultural tools) increased significantly for households in the treatment group. Moreover households that received cash transfers are more likely to face a shock related to livestock stolen or died, and are less exposed to income shocks due to house damages. They had also significantly reduced access to social safety nets based on free food distribution or agricultural inputs compared to control households. A relevant impact is observed on health-related variables: the self-reported index of poor health status for the head of the households decreases from 74% to 3% in the treatment group while it remains almost stable for the control. Similarly, the percentage of household heads who reported being sick

for more than one month in the previous year was halved between the baseline and the final round, dropping from 35% to 17%.

Table 1 *– Descriptive Statistics at Baseline and at the Final Round*

	Baseline			Final Round		
variable (% of)	**control**	**treatment**	**full sample**	**control**	**treatment**	**full sample**
Assets' ownership						
furnitures (bed, table, chairs)	0.09	0.08	0.09	**0.1 *** **	**0.24**	**0.17**
animals (chicken, goats, others)	0.11	0.13	0.12	**0.11 *** **	**0.89**	**0.49**
agricoltural tools (hoe, axe, sickle)	0.9	0.88	0.88	**0.8 *** **	**0.96**	**0.89**
Shocks (over the past 2 yrs)						
lower yields due to drought/floods	0.43 ***	0.59	0.49	**0.21**	**0.19**	**0.2**
crop disease	0.26	0.30	0.28	**0.11 ** **	**0.17**	**0.14**
livestock stolen or died	0.19	0.17	0.18	**0.08 *** **	**0.28**	**0.18**
rise in price of food	0.53	0.57	0.55	**0.48 *** **	**0.57**	**0.52**
birth in hh in past 2 years	0.05	0.06	0.06	0.01	0.01	0.01
theft	0.09	0.08	0.09	0.06	0.04	0.05
house damage	0.37	0.38	0.37	**0.31 *** **	**0.18**	**0.25**
Social safety nets						
Free food distribution	0.34	0.30	0.32	**0.20 *** **	**0.13**	**0.16**
Agricoltural inputs (starter pack)	0.07	0.1	0.08	**0.00 *** **	**0.03**	**0.02**
Inputs subsidy program	0.40 ***	0.49	0.44	0.52 ***	0.66	0.59
Annual consumption expenditures per adult equivalent						
Total consumption (mean)	3593.4	3944.7	3763.2	**4361.2 *** **	**28247.8**	**15905.8**
tot cons (median)	1648	1748	1681.2	**2127.9 *** **	**23060.2**	**9207.8**
Food consumption (mean)	2630.4	2798.9	2711.8	**2695.3 *** **	**20111.2**	**11112.6**
food cons (median)	547.3	751.1	630.3	**511.5 *** **	**16156.3**	**4471.0**
Private transfers						
Gifts	0.32 *	0.37	0.34	**0.35 *** **	**0.08**	**0.22**
Remittances	0.08	0.07	0.07	**0.05 *** **	**0.01**	**0.03**
Loans (informal)	0.13	0.16	0.14	0.12	0.13	0.13
Head of household's characteristics						
gender (female=1)	0.65	0.63	0.64	0.67	0.63	0.65
no education	0.63 ***	0.43	0.53	0.61 ***	0.47	0.54
age (mean)	63.8 **	60.9	62.4	65.1 ***	61.4	63.3
over 65	0.61 ***	0.51	0.56	0.62 ***	0.50	0.57
poor health status (self reported)	0.77	0.74	0.75	**0.67 *** **	**0.3**	**0.49**
sick for more than 1 month	0.31	0.35	0.33	**0.22 ** **	**0.17**	**0.2**
married	0.26	0.27	0.27	**0.25 * **	**0.3**	**0.27**
single	0.02	0.02	0.02	0.02	0.02	0.02
widow	0.56	0.53	0.57	**0.57 ** **	**0.51**	**0.54**
divorced	0.15	0.16	0.16	0.15	0.16	0.16
Household characteristics						
presence of orphans	0.46 ***	0.59	0.52	0.43 ***	0.52	0.47
hhsize	3.5 ***	4.7	4.1	3.5 ***	4.5	4
hhchildren	2.05 ***	3.09	2.55	2 ***	2.8	2.4
persons living with HIV	0.03	0.02	0.03	0.04	0.05	0.04
members with disabilities	0.22	0.21	0.21	0.14	0.12	0.13
chronically ill adults	0.31	0.35	0.33	**0.24 * **	**0.20**	**0.22**
nr of meals the day before	1.49	1.46	1.47	**1.50 *** **	**2.4**	**1.9**

Notes: based on the sample of 749h (387 control and 362 treatment). "*" indicates significance level (at the *** 1% level, ** 5% level, * 10% level) of t-test comparing treatment and control. Figures in **bold** highlight the most relevant changes occurred at the final round compared to baseline.

Finally the variables on annual real total consumption and food only consumption expenditures per adult equivalent confirm the well executed randomized design at baseline, and shows impressive changes in the final round, which will be further analyzed in the multivariate econometric analysis in the next section. The same applies to the descriptive statistics on private transfers: these show significant changes in gifts and remittances between baseline and the final round that will be also part of the econometric analysis of the crowding out effect in the next section. In order to perform the econometric analysis on consumption, the expenditure per adult equivalent was calculated to take into account the different size and composition of the households. For the analysis of private arrangements, we relied on respondents' reports of transfers received by each household. In particular, under the section dedicated to the sources of income, respondents were asked about the sources of support and income that the household received in the 12 months preceding the interview. Respondents reported whether they received each of these income sources, and, if yes, the amount in local currency, the frequency and the periodicity in the past year. On the basis of this information, we focused on three specific sources of income and support which are most likely to be related to the concept of inter-household private transfers and arrangements: remittances from family members employed elsewhere; gifts from family/friend/other; loans from family/friend/other. These three sources are all defined at the household level and therefore the household is our unit of analysis. For each of these three categories, we built an indicator that takes value one if a household has received the transfer. Moreover, by aggregating the information provided for these three transfers' sources separately, we built an indicator for those households that have received at least one transfer in the past year, regardless of the type of transfer.

5. Econometric Analysis

The econometric analysis is divided into two parts: the first aims at testing for the presence of perfect risk sharing arrangements at village level by estimating the impact of unconditional cash transfers on consumption. The second part aims at measuring the impact of cash transfers on pre-existing private arrangements and consequently at assessing the presence and the level of crowding out effects of private insurance by public transfers.

5.1 Risk Sharing and Cash Transfers

The premise underlying most of the standard tests in the risk sharing literature is to assess whether idiosyncratic shocks contain any information that could explain consumption growth. The perfect risk sharing hypothesis implies that such shocks will have no impact as their effects will be perfectly shared across the members of the community.

In Section 3.2, it has been highlighted how the literature has rejected this hypothesis in a variety of contexts. Still it is interesting to investigate it in the context of rural Malawi, as its rejection would provide support for the introduction of social protection mechanisms helping households to pool risk more effectively. The dataset allowed us to construct the consumption variables for both round 1 (i.e. baseline round) and round 3 (final round). We looked at two specifications of consumption: food consumption and total consumption. The food consumption variable has been constructed as the sum of the expenditures on more than 110 food items consumed at the household level over the week preceding the interview. In particular, the food items were grouped in the following categories: cereals and grains, roots and tubers, pulses, vegetables, meat, fish and animal products, fruits, cooked food from vendors, milk and milk products, sugar, fats and oil, beverages, spices and miscellaneous (Miller, Tsoka, Reichert 2010b). The non-food consumption variable is the result of the sum of expenditures on more than 30 non-food items divided on the basis of one week, one month or one year recall. The one week recall category includes items like charcoal, cigarettes, matches, newspapers and public transports; the one month recall category includes a range of items from bar soap and other personal care products to light bulbs, bicycle and vehicle repair services, electricity and telephone units; the one year recall category includes carpets, mosquito nets, building items, insurance, funeral costs, marriage costs and gifts[7]. The sample contains households of different sizes and compositions: so it is therefore important to adjust our consumption estimates for these differences as we would introduce an important distortion in the results otherwise (White and Masset, 2003). This leads to the concept of adult equivalence scales. Using OECD equivalence scales, we then calculated the expenditure per adult equivalent following the same approach used by White and Masset (2003), with the total number of adult equivalents per household *i* given by:

$$AE_i = \sum \boldsymbol{\beta}_{j,i}$$

[7] All consumption variables have been harmonized as annual variables.

where $\boldsymbol{\beta}_{j,i}$ is the adult equivalent for individual *j* in household *i*. We use a single calorific equivalence scale based on OECD recommendations and we assign to each child in the age group 0-18 years a value of $\beta = 0.3$ of an adult, and a value of $\beta = 0.5$ to each other adult in the household which is not head of the household. Against this background, the total consumption variable to be used in the econometric specification is constructed as the sum of household food and non food consumption scaled by equivalents. Consumption is expressed in March 2007 prices using the annual inflation rate for rural areas provided by the Malawi Statistical Office.

Quantile regression models were used to quantify outcomes at the median and at the .25 and .75 quantile: this choice allows for a type of robust regression analysis which reduces the influence of outliers. The dependent variable used in the analysis is given by the ratio of the variation of consumption between the final round and the baseline round over the average total consumption measured at t_0 and t_1. This is an alternative measure of consumption variation used in place of the more traditional difference in logarithmic consumption at t_1 and t_0. The econometric specification can be written as:

$$\Delta c_i = \beta_0 + \beta_1 T_i + \beta_2 X_i + \beta_3 Z_i + \varepsilon_h \qquad (1)$$

where the dependent variable, defined as $[(c_1-c_0)/(c_1+c_0)]*2$, is regressed on a constant and a set of taste shifters Z_i like the household composition as well as age, sex, health and marital status of the head of the household. Moreover, a set of variables X_i measuring idiosyncratic shocks at household and village level affecting the level of income, such as crop pests, livestock stolen and price shocks, was used. The transfer T is also part of the regression. Under the perfect risk sharing hypothesis, the coefficients on idiosyncratic shocks and on the transfer should be equal to zero. If this is not the case, then it means that transfers and other shocks to income have an impact on the household's level of consumption and therefore the perfect risk sharing hypothesis is ruled out. In fact while usually negative shocks are considered good candidates for testing the effect of idiosyncratic shocks to consumption, we use a positive shock in the form of an unconditional cash transfers given to some households in the village, as idiosyncratic shock. Positive shocks should in fact also be shared and not affect household consumption directly, but only through aggregate village resources.

Table 2 *– Quantile Regressions: Total Consumption Expenditures*

Dependent variable: Ratio of the variation of consumption between t1 and t0 over total average consumption in t1 and t0						
	Median		**.25 quantile**		**.75 quantile**	
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**1.391** ***	**1.317** ***	**2.207** ***	**1.965** ***	**0.698** ***	**0.660** ***
	[0.036]	[0.074]	[0.085]	[0.076]	[0.038]	[0.040]
Village level shocks						
Lower yields due to drought or floods	**-0.004**	**-0.007**	**-0.130**	**-0.247** ***	**-0.015**	**0.000**
	[0.038]	[0.075]	[0.087]	[0.078]	[0.041]	[0.040]
Rise in food prices	**-0.103** ***	**-0.111**	**-0.096**	**0.012**	**-0.023**	**-0.009**
	[0.038]	[0.073]	[0.087]	[0.076]	[0.041]	[0.040]
HH level shocks						
Crop disease	**0.030**	**0.012**	**0.063**	**0.063**	**0.017**	**0.044**
	[0.041]	[0.079]	[0.095]	[0.082]	[0.043]	[0.043]
Livestock died or stolen	**-0.106** **	**-0.046**	**0.025**	**-0.023**	**0.009**	**-0.008**
	[0.047]	[0.091]	[0.111]	[0.096]	[0.049]	[0.048]
Theft	**-0.125** **	**-0.119**	**-0.006**	**-0.051**	**0.003**	**-0.026**
	[0.063]	[0.122]	[0.148]	[0.131]	[0.068]	[0.066]
House damage	**-0.079** **	**-0.105**	**-0.183** **	**-0.198** ***	**-0.043**	**-0.041**
	[0.037]	[0.072]	[0.087]	[0.076]	[0.040]	[0.038]
Safety net (food)	**0.029**	**0.005**	**-0.102**	**-0.165** **	**-0.012**	**-0.014**
	[0.039]	[0.076]	[0.092]	[0.082]	[0.041]	[0.040]
Safety net (agr. inputs)	**-0.273** ***	**-0.226** ***	**-0.228** ***	**-0.170** **	**-0.120** ***	**-0.107** ***
	[0.037]	[0.075]	[0.087]	[0.080]	[0.039]	[0.040]
HH assets						
Furnitures (mattress, table, chairs)		**0.101**		**0.258** **		**0.009**
		[0.128]		[0.129]		[0.068]
Animal (chickens, pigs, etc)		**-0.022**		**0.119**		**-0.065**
		[0.108]		[0.113]		[0.059]
Agr tools (axe, sickle, hoe)		**-0.193** *		**-0.283** **		**-0.059**
		[0.115]		[0.123]		[0.061]
HH characteristics						
HH size		**0.023**		**0.016**		**0.004**
		[0.021]		[0.025]		[0.011]
Chronically ill adults		**0.087**		**0.199** **		**0.054**
		[0.077]		[0.082]		[0.041]
Presence of orphans		**-0.015**		**-0.110**		**0.009**
		[0.083]		[0.087]		[0.045]
Deaths in the past 5 years		**-0.012**		**0.193** **		**-0.004**
		[0.078]		[0.082]		[0.040]
Disable persons		**0.040**		**0.037**		**0.071**
		[0.087]		[0.093]		[0.045]
Head of HH's charact.						
Female headed		**0.030**		**0.310** **		**0.035**
		[0.116]		[0.127]		[0.060]
Over 65 yrs old		**-0.044**		**-0.097**		**0.001**
		[0.083]		[0.086]		[0.044]
No education		**0.004**		**-0.076**		**-0.005**
		[0.074]		[0.079]		[0.039]
Poor health status in the past year		**0.118**		**0.317** ***		**0.016**
		[0.090]		[0.092]		[0.049]
Employment in past year		**-0.093**		**-0.193** **		**-0.053**
		[0.097]		[0.103]		[0.051]
Married		**-0.029**		**-0.435** *		**0.032**
		[0.252]		[0.263]		[0.134]
Divorced		**-0.054**		**-0.588** **		**0.021**
		[0.260]		[0.275]		[0.138]
Widow		**-0.106**		**-0.671** **		**0.015**
		[0.252]		[0.270]		[0.135]
Constant	**0.496** ***	**0.573** **	**-0.598** ***	**-0.119**	**1.248** ***	**1.218** ***
	[0.042]	[0.277]	[0.101]	[0.289]	[0.044]	[0.142]
Nr. of obs.	749	744	749	744	749	744
R-sq	0.23	0.25	0.31	0.34	0.13	0.14

Notes: Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

The design of the dataset, based on perfect randomization, allows ruling out the risk of distortions due to the so-called "program placement effect". Table 2 summarizes the econometric results for total consumption while Table 3 shows the results for food-only consumption. Two specifications are presented for each of the three quantile regressions. The first specifications controls only for village and household level shocks, while the second specification includes the whole set of controls (i.e. adding to the previous also household's assets, household's characteristics, and head of household's characteristics).

The results across all specifications for the coefficient on the variable of interest (indicating the reception of cash transfer) confirm the rejection of the hypothesis of perfect risk sharing, as in all cases, controlling for village level aggregate resources, the consumption levels are clearly affected by the (positive) idiosyncratic shock represented by cash transfers.

More specifically, Table 2 shows the impact of cash transfers on total consumption. It is interesting to note how the coefficient of "treated" varies according to the quantile regression. The coefficient in fact should be interpreted as the difference in median (or in the .25 or .75 quantile accordingly) of the variation of consumption in t_1 and t_0 between the treatment and the control group. So while across all groups the increase in the variation of consumption is statistically significant at the 1% level across all specifications, it is worth noting that those households in the .25 quantile of the distribution, meaning those household whose consumption would have varied the less in the absence of the cash transfers, are precisely those taking more advantage of the transfer by increasing their variation of consumption by a coefficient of 1.96.

On the other side, those households in the .75 quantile of the distribution, represent those who would have increased their consumption in any case, so their variation of consumption is still significant, but it increases less (the coefficient is equal to 0.66) compared to those in the median or in the .25 quantile of the distribution.

A similar trend is observable in Table 3 concerning the food-only consumption.

Regarding the significance of control variables, Table 2 shows that the presence of a social safety net based on agricultural inputs has a negative effect on the variation of consumption expenditures across the whole distribution (median, .25 and .75 quantile), probably explained by the fact that households who receive agricultural inputs are then able to cultivate and consume their own products, thus reducing consumption expenditures. Only those in the .25 quantile register a statistically significant reduction in their increase of consumption expenditures due to the presence of shocks like house damages, lower crop yields due to drought or floods and the presence of safety nets based on the distribution of free food. Moreover, while the remaining categories of

covariates used as controls are not statistically significant for those in the median and those in the .75 quantile of the distribution (with the only exception of agricultural tools for those in the median), this does not apply to households in the .25 quantile, whose consumption expenditures are then influenced by household's characteristics (e.g. presence of chronically ill adults or deaths in the family in the past 5 years) as well as by head of household's characteristics (e.g. female headed households have a positive impact on consumption while single heads of households increase their consumption more compared to married, divorced and widows). Similarly for the food only consumption covariates (Table 3), the full control specifications confirm the impact of safety nets consisting of agricultural inputs, while village level shocks, like a rise in the prices of food, have a negative impact on households in the median of the distribution. An increase in household's assets does not have any effect on the variation of consumption for those households in the .75 quantile of the distribution, while it seems to affect those in the median and those in the .25 quantile. In fact, for the former it is an increase in the number of animals that have a positive "wealth effect" on consumption expenditures, while for the latter the increase in furniture ownership has a positive effect and the increase in the number of agricultural tools available has a negative impact. Female headed households seem to have a statistically significant and positive impact on the variation of consumption only for those in the .25 quantile and in the median, while it is not significant for those living in the .75 quantile. The same applies to the condition of widows but with a negative impact on the variation of consumption. Finally, a counterintuitive result is given by the negative impact of employment in the past year across all specifications. A possible explanation could be that, given the rural environment, many temporary and irregular jobs are related to cultivation and the payment can be in kind instead of monetary. In this hypothesis then, the expenditures for consumption would be consistently lower.

Table 3 *– Quantile Regressions: Food Consumption Expenditures*

Dependent variable: Ratio of the variation of food cons. between t1 and t0 over total average food cons. in t1 and t0	**Median**		**.25 quantile**		**.75 quantile**	
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**1.710** ***	**1.694** ***	**2.587** ***	**2.333** ***	**0.691** ***	**0.677** ***
	[0.056]	[0.048]	[0.112]	[0.087]	[0.020]	[0.029]
Village level shocks						
Lower yields due to drought or floods	**-0.089**	**-0.101** **	**-0.046**	**-0.190** **	**0.005**	**0.019**
	[0.059]	[0.049]	[0.117]	[0.088]	[0.022]	[0.029]
Rise in food prices	**-0.117** **	**-0.113** **	**-0.232** **	**-0.028**	**-0.032**	**-0.046**
	[0.058]	[0.048]	[0.117]	[0.087]	[0.021]	[0.029]
HH level shocks						
Crop disease	**0.048**	**0.031**	**0.130**	**0.101**	**0.005**	**0.052** *
	[0.063]	[0.052]	[0.126]	[0.091]	[0.022]	[0.031]
Livestock died or stolen	**-0.007**	**0.029**	**0.050**	**-0.010**	**-0.005**	**-0.007**
	[0.072]	[0.060]	[0.148]	[0.106]	[0.025]	[0.035]
Theft	**0.019**	**0.006**	**-0.216**	**-0.130**	**-0.003**	**-0.029**
	[0.098]	[0.080]	[0.193]	[0.146]	[0.035]	[0.049]
House damage	**-0.086**	**-0.036**	**-0.225** **	**-0.139**	**-0.021**	**-0.029**
	[0.058]	[0.047]	[0.116]	[0.086]	[0.021]	[0.028]
Safety net (food)	**0.020**	**0.029**	**-0.054**	**-0.005**	**0.009**	**0.006**
	[0.061]	[0.050]	[0.122]	[0.090]	[0.021]	[0.029]
Safety net (agr. inputs)	**-0.118** **	**-0.126** **	**-0.181**	**-0.156** *	**-0.040** **	**-0.025**
	[0.058]	[0.049]	[0.115]	[0.088]	[0.020]	[0.028]
HH assets						
Furnitures (mattress, table, chairs)		**0.060**		**0.446** ***		**0.074**
		[0.084]		[0.146]		[0.050]
Animal (chickens, pigs, etc)		**0.183** **		**0.065**		**0.007**
		[0.072]		[0.125]		[0.041]
Agr tools (axe, sickle, hoe)		**-0.045**		**-0.363** ***		**-0.008**
		[0.073]		[0.140]		[0.045]
HH characteristics						
HH size		**0.006**		**0.032**		**-0.002**
		[0.014]		[0.025]		[0.008]
Chronically ill adults		**0.129** **		**0.301** ***		**0.044**
		[0.051]		[0.092]		[0.030]
Presence of orphans		**-0.022**		**-0.216** **		**0.004**
		[0.055]		[0.092]		[0.033]
Deaths in the past 5 years		**0.040**		**0.218** **		**0.003**
		[0.051]		[0.092]		[0.030]
Disable persons		**0.085**		**0.062**		**0.042**
		[0.057]		[0.104]		[0.034]
Head of HH's charact.						
Female headed		**0.152** **		**0.320** **		**0.068**
		[0.077]		[0.136]		[0.048]
Over 65 yrs old		**-0.048**		**-0.179** *		**-0.052** *
		[0.054]		[0.094]		[0.032]
No education		**0.020**		**-0.062**		**0.013**
		[0.048]		[0.088]		[0.029]
Poor health status in the past year		**0.012**		**0.354** ***		**0.014**
		[0.059]		[0.102]		[0.035]
Employment in past year		**-0.164** **		**-0.241** **		**-0.108** ***
		[0.064]		[0.114]		[0.038]
Married		**-0.056**		**-0.704** **		**0.160**
		[0.163]		[0.292]		[0.100]
Divorced		**-0.258**		**-0.912** ***		**0.119**
		[0.172]		[0.306]		[0.104]
Widow		**-0.280** *		**-1.004** ***		**0.098**
		[0.166]		[0.299]		[0.101]
Constant	**0.199**	**0.237**	**-1.060** ***	**-0.373**	**1.290** ***	**1.115** ***
	[0.065]	[0.180]	[0.134]	[0.323]	[0.022]	[0.104]
Nr. of obs.	749	744	749	744	749	744
R-sq	0.23	0.25	0.3	0.33	0.09	0.1

Notes: Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

5.2 Crowding out of Private Arrangements

Next, Probit models have been used to measure the impact of the social cash transfer on the probability of receiving private transfers. The presence of crowding out effects has been tested by using a structure of controls similar to the one used for testing consumption smoothing and includes aggregate shocks at village level, idiosyncratic shocks at household level, the presence of other externally provided safety nets, household characteristics and also demographic characteristics of the heads of household (i.e. age, gender, education level, health status and marital status and employment in the past year). We first looked at the crowding out effects of private transfers without making distinctions based on the type of transfers. Secondly, the same methodology has been applied on the probability for a household of receiving a transfer distinguishing between remittances, gifts and loans. The randomized design of the dataset allows us to isolate the effect of the public transfers by comparing treatment and control households and checking whether treatment households receive less frequent transfers than control households. Moreover the distinction between remittances, gifts and loans allows enriching the analysis with considerations linked to the geographical proximity (e.g. by comparing remittances from elsewhere and gifts from family or friends living closer to the reference household). The results for the average marginal effects based on Probit models are reported in Tables 4 to 7. Table 4 refers to any transfer. The control structure is progressively adding categories of control variables in each specification. It is interesting to note that the crowding out effect (i.e. a reduction of 24% in probability) of cash transfers (CT) on any private transfer is consistently significant across all specifications at 1% level. As shown in the next tables, the effects of gifts are likely to be dominant in the dependent variable used in Table 4, which aggregates the three different types of transfers. Moreover, the covariates included in the control structure show that an increase in assets (animals or agricultural tools) can reduce by 10 to 13% the probability of receiving private transfers, while the presence of disabled members in the household or the shock given by a theft in the past year can increase the probability of transfers by 8 and 10%, respectively.

Table 4 *– Marginal effects after Probit - Any private net transfer received*

Dependent variable = 1 if the household received a private transfer in the last 12 months						
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**-0.245** ***	**-0.246** ***	**-0.247** ***	**-0.251** ***	**-0.238** ***	**-0.242** ***
	[0.033]	[0.034]	[0.034]	[0.034]	[0.035]	[0.036]
Village level shocks						
Lower yields due to drought or floods		**0.023**	**0.023**	**0.022**	**0.019**	**0.006**
		[0.037]	[0.037]	[0.038]	[0.038]	[0.039]
Rise in food prices		**-0.032**	**-0.025**	**-0.017**	**-0.001**	**0.000**
		[0.036]	[0.037]	[0.037]	[0.038]	[0.038]
HH level shocks						
Crop disease			**0.031**	**0.041**	**0.058**	**0.060**
			[0.040]	[0.041]	[0.041]	[0.042]
Livestock died or stolen			**-0.079** *	**-0.066**	**-0.063**	**-0.058**
			[0.043]	[0.044]	[0.045]	[0.045]
Theft			**0.100**	**0.104** *	**0.097** *	**0.101** *
			[0.065]	[0.065]	[0.066]	[0.067]
House damage			**0.012**	**0.009**	**0.006**	**0.004**
			[0.037]	[0.037]	[0.037]	[0.037]
Safety net (food)			**0.033**	**0.029**	**0.013**	**0.006**
			[0.038]	[0.038]	[0.039]	[0.039]
Safety net (agr. inputs)			**-0.022**	**-0.004**	**0.013**	**0.001**
			[0.036]	[0.036]	[0.038]	[0.039]
HH assets						
Furnitures (mattress, table, chairs)				**-0.001**	**-0.010**	**-0.026**
				[0.063]	[0.063]	[0.064]
Animal (chickens, pigs, etc)				**-0.100** *	**-0.091** *	**-0.103** *
				[0.052]	[0.053]	[0.053]
Agr tools (axe, sickle, hoe)				**-0.144** ***	**-0.135** **	**-0.138** **
				[0.060]	[0.061]	[0.063]
HH characteristics						
HH size					**-0.012**	**-0.008**
					[0.009]	[0.011]
Chronically ill adults					**-0.008**	**-0.026**
					[0.038]	[0.039]
Presence of orphans					**-0.040**	**-0.040**
					[0.040]	[0.042]
Deaths in the past 5 years					**0.026**	**0.027**
					[0.040]	[0.041]
Disable persons					**0.080** *	**0.082** *
					[0.046]	[0.046]
Head of HH's charact.						
Female headed						**-0.018**
						[0.042]
Over 65 yrs old						**0.037**
						[0.042]
No education						**-0.022**
						[0.038]
Poor health status in the past year						**0.058**
						[0.045]
Employment in past year						**0.040**
						[0.051]
Nr. of obs.	749	749	749	749	748	744
R-sq	0.05	0.06	0.06	0.07	0.08	0.09

Notes: Table reports estimated marginal effects after probit.Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

Given the detailed information collected, it is useful to look at the different types of transfers separately in order to be able to isolate the net effect of cash transfers (Tables 5 to 7). Table 5 refers to remittances only. Here there is a small crowding out effect on private transfers due to the cash transfer (a reduction of 1.5% in the probability of receiving remittances for those households that receive CT). Remittances come from members of the household living abroad, either within or outside the country. The econometric analysis indicates that these have a compensation function with respect to shocks occurring at household level as when livestock die or is stolen implying a 2% increase in the probability of receiving a remittance. The presence of orphans in the household reduces the probability of receiving remittances by 1 percentage point, which may be explained by the fact that the orphan status of children implies a lower probability of family members surviving and working abroad. Moreover, the age of the household head also plays an important role: the older the household head, the higher the probability of receiving a remittance, thus confirming the role of informal "social security" that private transfer plays especially in developing countries where formal social security schemes are in most of the cases absent. Finally, an increase in the number of agricultural tools implies a decrease in the probability of receiving remittances, as agricultural tools can be interpreted as an instrument for wealth. Table 6 refers to gifts from family and friends. Here the crowding out effect on private transfer is strong and persistent with a 24% reduction in the probability of receiving private gifts for those households who receive the CT. Contrary to the case of remittances, here the loss of livestock implies a reduction of 6% in the probability of receiving a transfer. This difference might be explained by the fact that livestock ownership is somewhat rare. People who bought livestock rose above their neighbors so that losing livestock was not seen as dire. Therefore its loss implies a reduction in the inter-household level of transfers, while for a family member living abroad and whose income is not linked to livestock, a similar loss implies an increase in the probability of making a transfer. Here as well, an increase in the household's assets and particularly in agricultural tools indicates an increase in wealth and therefore implies a 10% reduction in the probability of receiving gifts. On the contrary the presence of disabled members is associated with a 9% increase in probability of receiving gifts. The fact that the crowding out effect is much stronger than in the case of remittances is in line with the idea that people living in the village or nearby have better information on the nature of the grant and therefore can react more to its introduction. This can also be read as a positive element, meaning that the flow of money in the village from members living outside is only marginally affected by the introduction of the cash transfer scheme and consequently it is possible to argue that the overall level of wealth in the village increases.

Table 5 *– Marginal effects after Probit - Remittances*

Dependent variable = 1 if the household received a remittance in the last 12 months						
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**-0.033 *** **	**-0.030 ** **	**-0.027 ** **	**-0.028 ** **	**-0.023 ** **	**-0.015 *** **
	[0.012]	[0.012]	[0.011]	[0.011]	[0.010]	[0.007]
Village level shocks						
Lower yields due to drought or floods		**-0.012**	**-0.013**	**-0.011**	**-0.010**	**-0.007 ** **
		[0.012]	[0.011]	[0.011]	[0.009]	[0.005]
Rise in food prices		**-0.003**	**-0.002**	**-0.002**	**0.000**	**0.000**
		[0.012]	[0.011]	[0.010]	[0.009]	[0.004]
HH level shocks						
Crop disease			**-0.003**	**-0.001**	**-0.002**	**-0.001**
			[0.011]	[0.011]	[0.010]	[0.004]
Livestock died or stolen			**0.032 ** **	**0.031 ** **	**0.029 ** **	**0.020 *** **
			[0.019]	[0.019]	[0.017]	[0.012]
Theft			**0.019**	**0.019**	**0.017**	**0.011**
			[0.023]	[0.023]	[0.022]	[0.013]
House damage			**-0.006**	**-0.005**	**-0.004**	**-0.001**
			[0.010]	[0.010]	[0.009]	[0.004]
Safety net (food)			**0.003**	**0.002**	**0.001**	**-0.001**
			[0.011]	[0.010]	[0.010]	[0.004]
Safety net (agr. inputs)			**0.012**	**0.014**	**0.011**	**0.004**
			[0.011]	[0.011]	[0.010]	[0.005]
HH assets						
Furnitures (mattress, table, chairs)				**-0.007**	**-0.007**	**-0.004**
				[0.013]	[0.011]	[0.003]
Animal (chickens, pigs, etc)				**0.007**	**0.006**	**0.002**
				[0.017]	[0.015]	[0.006]
Agr tools (axe, sickle, hoe)				**-0.035 ***	**-0.036 ** **	**-0.023 ** **
				[0.026]	[0.026]	[0.018]
HH characteristics						
HH size					**0.001**	**0.001**
					[0.002]	[0.001]
Chronically ill adults					**-0.005**	**-0.003**
					[0.009]	[0.003]
Presence of orphans					**-0.024 ** **	**-0.011 ** **
					[0.012]	[0.007]
Deaths in the past 5 years					**0.012**	**0.007**
					[0.012]	[0.007]
Disable persons					**-0.014**	**-0.005**
					[0.008]	[0.004]
Head of HH's charact.						
Female headed						**-0.003**
						[0.004]
Over 65 yrs old						**0.024** ***
						[0.009]
No education						**-0.013** ***
						[0.007]
Poor health status in the past year						**-0.005**
						[0.007]
Employment in past year						**0.003**
						[0.006]
Nr. of obs.	749	749	749	749	748	744
R-sq	0.03	0.04	0.08	0.1	0.14	0.27

Notes: Table reports estimated marginal effects after probit.Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

Table 6 *– Marginal effects after Probit - Gifts*

Dependent variable = 1 if the household received a gift in the last 12 months						
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**-0.26 *** **	**-0.258 *** **	**-0.257 *** **	**-0.259 *** **	**-0.240 *** **	**-0.239 *** **
	[0.028]	[0.029]	[0.029]	[0.034]	[0.030]	[0.030]
Village level shocks						
Lower yields due to drought or floods		**0.020**	**0.030**	**0.028**	**0.026**	**0.022**
		[0.031]	[0.031]	[0.038]	[0.031]	[0.032]
Rise in food prices		**-0.076 ***	**-0.073 ***	**-0.066 ** **	**-0.046**	**-0.045**
		[0.031]	[0.031]	[0.037]	[0.031]	[0.031]
HH level shocks						
Crop disease			**-0.024**	**-0.016**	**0.004**	**0.005**
			[0.033]	[0.041]	[0.034]	[0.035]
Livestock died or stolen			**-0.076 ** **	**-0.069 ***	**-0.064 ***	**-0.058 ***
			[0.033]	[0.044]	[0.034]	[0.035]
Theft			**-0.007**	**-0.003**	**-0.012**	**-0.013**
			[0.051]	[0.065]	[0.050]	[0.050]
House damage			**-0.007**	**-0.009**	**-0.010**	**-0.013**
			[0.031]	[0.037]	[0.030]	[0.030]
Safety net (food)			**0.048**	**0.046**	**0.024**	**0.023**
			[0.033]	0.038]	[0.033]	[0.033]
Safety net (agr. inputs)			**-0.013**	**0.000**	**0.022**	**0.016**
			[0.030]	[0.037]	[0.032]	[0.032]
HH assets						
Furnitures (mattress, table, chairs)				**0.005**	**-0.009**	**-0.022**
				[0.063]	[0.051]	[0.051]
Animal (chickens, pigs, etc)				**-0.071**	**-0.056**	**-0.069**
				0.0517	[0.043]	[0.042]
Agr tools (axe, sickle, hoe)				**-0.113 ** **	**-0.096 ** **	**-0.105 ** **
				[0.060]	[0.054]	[0.056]
HH characteristics						
HH size					**-0.018 ** **	**-0.013**
					[0.008]	[0.009]
Chronically ill adults					**0.010**	**0.002**
					[0.031]	[0.033]
Presence of orphans					**-0.017**	**-0.019**
					[0.034]	[0.035]
Deaths in the past 5 years					**0.026**	**-0.004**
					[0.033]	[0.034]
Disable persons					**-0.011 ** **	**0.088 ** **
					[0.040]	[0.041]
Head of HH's charact.						
Female headed						**-0.021**
						[0.035]
Over 65 yrs old						**0.043**
						[0.035]
No education						**-0.002**
						[0.032]
Poor health status in the past year						**0.007**
						[0.039]
Employment in past year						**-0.027**
						[0.041]
Nr. of obs.	749	749	749	749	748	744
R-sq	0.1	0.1	0.11	0.12	0.14	0.15

Notes: Table reports estimated marginal effects after probit.Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

Finally, Table 7 focuses on loans. It is interesting to note that there is no crowding out effect when we look at loans from other family members and friends. In this case the reception of the public cash transfer seems to not have any significant impact on the probability of receiving a loan from family or friends. On the contrary, an explanatory variable for informal loans showing a strong statistical significance is a dummy indicating whether the household had already been borrowing money in the past (i.e. before the start of the program). In fact, those households who were already borrowing money have a 20% increase in the probability of receiving a loan which is independent of their cash transfer recipient status. This highlights an interesting mechanism of the functioning of informal rural credit markets, where the reputation of the borrower built through repeated interactions can often play a crucial role, comparable to collateral. Moreover, by looking at the rest of covariates in the regression model, the probability of receiving a loan seems to be also influenced by shocks and head of household's characteristics: for instance, having an agricultural output shock (e.g. a crop disease), increases the probability of receiving a loan by 6%, while being an older head of household reduces the probability of receiving a loan by 6%. Against this background a question remains open about whether the crowding out observed for gifts should be interpreted as a negative side-effect of the intervention and therefore requires a correction in the program design or, on the contrary, it could be seen as a signal that resources are re-allocated within the village economy and directed to other needy recipients. Additional information provided by the questionnaire tells us that 9% of cash transfer beneficiaries share the received cash with neighbors or others outside the household, 14% regularly share food bought with the cash transfer with neighbors or others, while 23% have started a business with funds from the cash transfer (Miller 2011). This piece of information, coupled with the result on remittances which shows that the crowding out effect on this type of transfer is extremely small, seems to suggest that the amount of additional resources generated by the cash transfer can be used for a better re-allocation of resources among households within the village (Miller 2011).

Table 7 *– Marginal effects after Probit - Loans*

Dependent variable = 1 if the household received a loan in the last 12 months						
	[1]	[2]	[3]	[4]	[5]	[6]
treated	**0.0086**	**0.004**	**0.002**	**0.002**	**0.007**	**0.007**
	[0.024]	[0.025]	[0.024]	[0.024]	[0.028]	[0.028]
Village level shocks						
Lower yields due to drought or floods		**0.022**	**0.011**	**0.011**	**0.011**	**0.004**
		[0.025]	[0.026]	[0.026]	[0.025]	[0.025]
Rise in food prices		**0.035**	**0.038**	**0.038**	**0.028**	**0.023**
		[0.025]	[0.025]	[0.025]	[0.025]	[0.025]
HH level shocks						
Crop disease			**0.061 ****	**0.061 ****	**0.059 ****	**0.064 ****
			[0.030]	[0.030]	[0.030]	[0.030]
Livestock died or stolen			**-0.028**	**-0.025**	**-0.025**	**-0.026**
			[0.029]	[0.030]	[0.028]	[0.028]
Theft			**0.082 ***	**0.081 ***	**0.062**	**0.068**
			[0.052]	[0.052]	[0.049]	[0.049]
House damage			**0.000**	**0.001**	**0.000**	**0.002**
			[0.025]	[0.025]	[0.024]	[0.024]
Safety net (food)			**-0.029**	**-0.029**	**-0.026**	**-0.028**
			[0.025]	[0.025]	[0.025]	[0.025]
Safety net (agr. inputs)			**-0.004**	**-0.002**	**-0.020**	**-0.025**
			[0.025]	[0.025]	[0.025]	[0.025]
HH assets						
Furnitures (mattress, table, chairs)				**-0.002**	**-0.002**	**-0.009**
				[0.043]	[0.043]	[0.042]
Animal (chickens, pigs, etc)				**-0.026**	**-0.027**	**-0.031**
				[0.034]	[0.033]	[0.033]
Agr tools (axe, sickle, hoe)				**0.012**	**0.004**	**0.008**
				[0.038]	[0.039]	[0.037]
HH characteristics						
HH size					**0.005**	**0.005**
					[0.006]	[0.007]
Chronically ill adults					**0.020**	**0.004**
					[0.026]	[0.026]
Presence of orphans					**0.019**	**0.010**
					[0.027]	[0.027]
Deaths in the past 5 years					**0.000**	**0.000**
					[0.026]	[0.026]
Disable persons					**0.003**	**0.007**
					[0.030]	[0.030]
Credit in past year					**0.210 *****	**0.206 *****
					[0.063]	[0.063]
Credit*treated					**-0.055**	**-0.057**
					[0.038]	[0.036]
Head of HH's charact.						
Female headed						**0.018**
						[0.027]
Over 65 yrs old						**-0.042**
						[0.028]
No education						**-0.012**
						[0.024]
Poor health status in the past year						**0.062 ****
						[0.024]
Employment in past year						**0.009**
						[0.032]
Nr. of obs.	749	749	749	749	748	744
R-sq	0.01	0.01	0.02	0.02	0.06	0.08

Notes: Table reports estimated marginal effects after probit. Significant at the *** 1% level, ** 5% level, * 10% level. Robust standard errors in squared brackets.

6. Conclusions

In this paper we explore the short-run consumption expenditure dynamics and the interaction of public and private arrangements using a randomized sample of 749 rural households in Malawi. The context of rural Malawi represents an extremely interesting setting due to the high HIV/AIDS prevalence that has inevitably shaped the social structure of many households. Moreover, the cash transfer pilot project used in the analysis represents one of the first experiments of social protection policies based on unconditional cash transfers in Sub-Saharan Africa. We exploit the unique source of exogenous variation provided by the randomized component of the program in order to isolate the effect of cash transfers on consumption expenditures as well as the net crowding out effect of cash transfers on private arrangements. We find a large effect in the level of variation of consumption expenditures for those households receiving the cash transfer. The effect is statistically significant across all specifications. The magnitude of the coefficient varies on the basis of the distribution's quantile, showing that households in the .25 quantile of the variation of consumption's distribution (i.e. those households that, in the absence of the cash transfer, would have shown a smaller variation in consumption expenditures) are those who register the highest increase in their consumption expenditures, while households in the .75 quantile increase their expenditures less (as they would have probably increased it in any case). These findings confirm the rejection of the perfect risk sharing hypothesis and suggest that there might be an important role for public interventions that might help households to pool risk more effectively. Consequently, the government's initiative of implementing a public cash transfer program seems to be well justified by the type of risk sharing arrangements and market imperfections existing at the village level.

However, in order to test how such public interventions interact with pre-existing private arrangements at village level we have also looked at the effects of cash transfers on private transfers in a context where the social fabric is already heavily compromised by the presence of high HIV/AIDS rates, and characterized by imperfect enforceability of contracts.

On the basis of the detailed information provided in the dataset, we could distinguish among three different types of private transfers: remittances, informal loans from friends or other family members and gifts from friends or other family members without the expectation of repayment. Results confirm the presence of crowding out effects on private arrangements when looking at gifts and, to a lesser extent, remittances, while informal loans seem to be completely independent from the cash transfer's reception. The fact that the crowding out effect is much stronger in the case of

gifts than in the case of remittances is in line with the idea that people living in the village, or near-by, have better information on the nature of the grant and therefore can react more to its introduction. The control structure used in the analysis, checking for shocks at household and village level as well as for household's specific characteristics, confirm the robustness of the findings which are not an artifact of shocks or demographic features. Finally, the result concerning informal loans that depend on pre-existing credit transactions rather than on the public cash transfer highlights an interesting feature of the functioning of informal rural credit markets which should be further explored in future research on the basis of additional data collection.

From a policy perspective, the present paper offers a contribution to the evaluation of the very recent wave of social protection policies based on (unconditional) cash transfers in Sub-Saharan Africa, on one side by showing that similar policies may be well motivated on the basis of the imperfect risk sharing arrangements existing at the village level and, on the other side, by highlighting the importance of taking into account the interactions of these policies with pre-existing private arrangements.

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